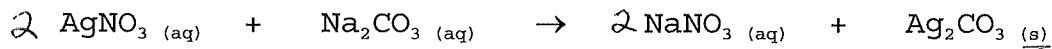


Stoichiometry

1. Balance the following chemical equation. What type of reaction is it?



Double Displacement Reaction
(also Precipitation Reaction)

2. Find the molar masses of AgNO_3 , Na_2CO_3 and Ag_2CO_3 ?

$$\begin{aligned} \text{AgNO}_3 : \quad & 1 \times \text{Ag} = 1 \times 107.87 \text{ g/mol} = 107.87 \text{ g/mol} \\ & 1 \times \text{N} = 1 \times 14.01 \text{ g/mol} = 14.01 \text{ g/mol} \\ & 3 \times \text{O} = 3 \times 16.00 \text{ g/mol} = 48.00 \text{ g/mol} \\ & \hline & 169.88 \text{ g/mol} \end{aligned}$$

$$\begin{aligned} \text{Na}_2\text{CO}_3 : \quad & 2 \times \text{Na} = 2 \times 22.99 \text{ g/mol} = 45.98 \text{ g/mol} \\ & 1 \times \text{C} = 1 \times 12.01 \text{ g/mol} = 12.01 \text{ g/mol} \\ & 3 \times \text{O} = 3 \times 16.00 \text{ g/mol} = 48.00 \text{ g/mol} \\ & \hline & 105.99 \text{ g/mol} \end{aligned}$$

$$\begin{aligned} \text{Ag}_2\text{CO}_3 : \quad & 2 \times \text{Ag} = 2 \times 107.87 \text{ g/mol} = 215.74 \text{ g/mol} \\ & 1 \times \text{C} = 1 \times 12.01 \text{ g/mol} = 12.01 \text{ g/mol} \\ & 3 \times \text{O} = 3 \times 16.00 \text{ g/mol} = 48.00 \text{ g/mol} \\ & \hline & 275.75 \text{ g/mol} \end{aligned}$$

3. How many moles of Ag_2CO_3 will be produced when 3.0 mol AgNO_3 are consumed in an excess of Na_2CO_3 ?

$$3.0 \text{ mol AgNO}_3 \left(\frac{1 \text{ mol Ag}_2\text{CO}_3}{2 \text{ mol AgNO}_3} \right) = 1.5 \text{ mol Ag}_2\text{CO}_3$$

4. How many grams of AgNO_3 are required to completely react with 2.65g of Na_2CO_3 ?

$$2.65 \text{ g } \text{Na}_2\text{CO}_3 \left(\frac{1 \text{ mol } \text{Na}_2\text{CO}_3}{105.99 \text{ g } \text{Na}_2\text{CO}_3} \right) \left(\frac{2 \text{ mol } \text{AgNO}_3}{1 \text{ mol } \text{Na}_2\text{CO}_3} \right) \left(\frac{169.88 \text{ g } \text{AgNO}_3}{1 \text{ mol } \text{AgNO}_3} \right) = 8.49 \text{ g } \underline{\underline{\text{AgNO}_3}}$$

5. (a) How many grams of Ag_2CO_3 will be produced when 5.32g of AgNO_3 react with 3.47g of Na_2CO_3 ? What is the limiting reagent?

$$5.32 \text{ g } \text{AgNO}_3 \left(\frac{1 \text{ mol } \text{AgNO}_3}{169.88 \text{ g } \text{AgNO}_3} \right) \left(\frac{1 \text{ mol } \text{Ag}_2\text{CO}_3}{2 \text{ mol } \text{AgNO}_3} \right) \left(\frac{275.75 \text{ g } \text{Ag}_2\text{CO}_3}{1 \text{ mol } \text{Ag}_2\text{CO}_3} \right) = \underline{\underline{4.32 \text{ g } \text{Ag}_2\text{CO}_3}}$$

$$3.47 \text{ g } \text{Na}_2\text{CO}_3 \left(\frac{1 \text{ mol } \text{Na}_2\text{CO}_3}{105.99 \text{ g } \text{Na}_2\text{CO}_3} \right) \left(\frac{1 \text{ mol } \text{Ag}_2\text{CO}_3}{1 \text{ mol } \text{Na}_2\text{CO}_3} \right) \left(\frac{275.75 \text{ g } \text{Ag}_2\text{CO}_3}{1 \text{ mol } \text{Ag}_2\text{CO}_3} \right) = 9.03 \text{ g } \text{Ag}_2\text{CO}_3$$

AgNO_3 is the limiting reagent

Ag_2CO_3 produced : 4.32 g

- (b) If 3.18g Ag_2CO_3 were obtained by this reaction. What is the percent yield?

$$\begin{aligned} \% \text{ yield} &= \frac{\text{Actual Yield}}{\text{Theo. Yield}} \times 100 \\ &= \frac{3.18 \text{ g}}{4.32 \text{ g}} \times 100 = \underline{\underline{73.6\%}} \end{aligned}$$